

# How Great Britain Fights in the Air

Brig. Gen. Charles Frederick Lee



A PORTANT MACHINE READY TO START ON BOMBING



PLANE'S FIRST AIR FORCE - CANNONRY, STONY HEAD BY GUNSHIP HAS BROUGHT DOWN AT LEAST 120000 PLANE'S



BRIG. GEN. CHARLES FREDERICK LEE



ONE OF THE BOMBERS DOWNED BY NEW LINE

Examine General Charles Frederick Lee, of the British Air Force, now in the United States who has spent the last few years in the air. He is a man of about 40, with a mustache, wearing a military uniform. He is standing next to a large, cylindrical object, possibly a bomb or a piece of equipment.

The allies have been fighting the Hun for over four years, and the British empire has sustained 2,000,000 casualties, yet, contrary to popular opinion, the greatest life-saver in the present war is the airplane. Without the airplane, the war would be a different story.

There is no doubt whatever that on the western front we have a definite, almost an overwhelming, superiority in the air. It is this superiority in the air which enables us to bomb Germany and bring the war home to her, and makes it possible for an offensive to succeed. No offensive can be successful without cooperation between all arms and the most implicit trust in the aviation service by leaders and men alike.

Machines have been developed along definite lines for definite purposes. In the old days any machine was used for any duty. In those days it was only necessary for a pilot to fly a machine and have an elementary knowledge of other matters. Nowadays anyone can be taught to fly—that is the easiest part of the training. The difficult part comes with specialization. A pilot has to be taught to fly and fight in small single-seater scouts. He has to be taught, on highly specialized lines, the art of bombing, and last, he has to be taught co-operation with other arms. This last duty is one of the most difficult to teach and perhaps the most important of all.

As I began by saying, flying is designed to save life. Take, for instance, a machine which flies at a height ranging between 50 feet and 400 feet, and searches for information which is invaluable to the commander of the sector in which an attack is going to take place. It is up to the pilot of an airplane to discover if the batteries are active or if they are only camouflaged make-believe. If he can transmit the facts to the artillery commander, in the one case he can have the battery destroyed and prevented from shelling our troops, and in the case of a camouflaged dog he can save the battery commander the trouble of firing at it. On the same lines it is the duty of the pilot to see where the trench mortars are in order that they may be knocked out before the attack begins, as well as the machine gun emplacements which cause such havoc to an attack if they have not been previously dealt with. Last, but not least, it is essential to know the wire in front of the German trenches and

been cut efficiently. If it has been, all is well. If it has not, it is necessary for the artillery to begin shelling it, in order that an infantry regiment may not start an attack only to find itself held up on German barbed wire. The saving of life by an efficient air force is absolutely colossal.

The airplane must descend from the realm of mystery it has occupied in the public mind and assume its practical form. It should be looked on as a machine designed to carry a man through the air for a definite purpose, and that purpose is to help those on the ground to go forward.

We have to rid ourselves of mistaken notions. The life of a pilot is really far more comfortable than is possible for his comrades in the infantry, cavalry or artillery. The infantry when in the trenches are shelled continually and often heavily. They have to sleep in dugouts, some wet and some dry. They are at war the whole time except, of course, when they are back at rest. But the pilot, though his period of fighting may continue for weeks and months at a time, has a definite job to do each day. He knows when that job is over he will return to a clean house, a clean meal and a clean bed. His morale is excellent. He is doing the best machine the government can supply. He does not see the dirty side of the war. He does not find in the air the gas and the filth of the ground. It is not to be wondered at that he is proud to be in the air division. A certain type of person writes on the dangers of flying and the way he prevented himself from being killed, yet one-fourth of the untold stories in the trenches would make the air pilot's story sound very small. Yet the airman is all important. It would not help much if America sent ten millions of men to France if there was not an efficient air service back of them.

Fortunately, things are going well. The United States has pilots of the right kind, and the material is now going overseas in the right way. I have been fortunate enough to see a good deal of American flying men, of the training which is going on in this country and of a certain number of American cadets in England. Personally, I have nothing but praise for American flyers, and those at home have nothing but praise for the cadets there. And how important a thorough training is! However well a pilot may fly, however good his machine may be, unless he can kill his opponent in the air, he is, to all intents and purposes, useless. To do that he must have a gun, use a preponderance of fire, outmaneuver his enemy and bring him down. There are several means and ways of achieving this excellent result. Some Germans have been forced to land without having been fired on; others have been brought down by machine-gun fire in the air, and a few by anti-aircraft fire from the ground. Again, a very small number have been shot down by infantry gunfire from trenches. The more Germans brought down, the less sacrifices of life we have on our side of the lines. Say a German airplane has come over our side of the lines; say he has taken photographs of our artillery position; say he has photographed trenches where we are assembling to attack—it is perfectly easy for him, if not interfered with, to take these back, have them developed and issued to the artillery. He can also call up batteries by wireless and have them train their guns on the infantry so assembled. Hence, it is absolutely necessary that every hostile machine in the air at all, shall be brought down whenever and wherever possible. Only by this means can we save our own men on the ground.

With the airman came the air-gunner. In 1914

and the only part of 1915 pilots and observers carried rifles, and the pilots, at that time, sat behind. There were no machine guns on airplanes. Men undoubtedly fought in the air, but these scraps generally resulted in two machines maneuvering around each other and occasionally getting in a shot. Sometimes one machine of the other was forced to land for lack of gasoline. It was extremely lucky if you could put in a shot that would either disable the pilot or knock out the machine. Not until the advent of the Lewis gun did aerial gunnery really begin to make itself felt. Those handy little weapons were mounted on tripods on each side of the machine and cut down to decrease weight. This, however, though the beginning, was never satisfactory, and the stoppages in the machine gun were frequent. In the middle of 1915, the German aviation had a single movable gun in the rear cockpit which caused quite a lot of trouble to the allies. This was followed by the French Nieuport machine, which had a Lewis gun mounted over the top plane, and at the same time we developed a ring mounting in the observer's cockpit. It thus became a rare not only in machines but also in gunnery as to who could bring the most effective fire to bear on the adversary. In the autumn of 1915 experiments were made with the Vickers gun firing through the propeller. The blades were protected by steel plates called deflectors, which were so placed that when a bullet struck the blade it glanced off. No form of synchronous gear had been evolved, but it was the beginning of a system which is now universal. Late in 1915 the Vickers made its appearance. This machine had not a great speed, but it did have a synchronizing gear, i. e., a gear which enabled the machine gun to fire through the blades of the propeller without hitting the blades and without any loss of efficiency. It had quite a success for a time until the French got out the Spad gun and the British the Vickers gun. The latter was used by us quite extensively over the lines, but owing to the difficulty of training mechanics in its use and the small amount that was known of it in those days, it fell quite a lot as desired. This was followed by the Curtiss machine, which proved very satisfactory. Here, then, was a definite progress in aerial gunnery, and today we have on every machine two or three or four machine guns, two firing through the propeller and two being used by the observer behind. In the case of a two-seater, if you consider the amount of rounds which can be fired on the enemy from a machine, you will understand what a menace it is. You can fire 600 rounds per minute from each gun; hence the pilot can fire 1,200 rounds per minute, and the observer can reach the same figure with his two guns.

Machines, of course, are specialized. There are single-seater machines, which depend entirely on their power of maneuver and gunfire. There are two-seater fighters, where the pilot and the observer have to work together the whole time. There are machines designed for co-operation with artillery which carry an observer and wireless. There are large machines for day bombing, and still larger machines designed for night bombing. Owing to the pace at which machines maneuver the sighting of machine guns becomes a very important factor. To hit an object in a vital spot, going 130 miles an hour, when your own machine is traveling at the same pace, requires a vast amount of training for pilots and observers, who practice gunnery continuously from the time they go on the ground school until they go overseas.

An extremely interesting form of flying has been perfected recently—cloud formation flying. In the olden days, and until most recently, pilots have been busy about going into clouds except as a means of defense. Actual cloud flying has been regarded with a certain amount of skepticism. But cloud flying today is a necessity.

Every day is not a fine day, and cloud flying has become the fashion. It is now possible for machines to go in formation through the clouds and meet above them and continue that formation on a compass bearing to their objective, come down through the clouds, bomb their objective, go up again and come home. That sounds simple, but it is simple only if pilots are properly trained for it, and have the right instruments.

Long-distance air raids into Germany are now quite common. An independent force of the R. A. F. has been formed for this purpose alone. It is independent of the army and carries out bomb raids only from its headquarters in France.

I would like to write something about aerial photography, that most useful adjunct of the work of the general staff, but considerations of space forbid. I have endeavored to show the vital importance of the air force, both offensive and defensive. My message can be summarized in very few words. Send over your Liberty engines in thousands. Send over your bright young American flyers in tens of thousands, and the end of both the war and the Hun will be in sight.

## Our Part in Feeding the Nation

(Special Information Service, United States Department of Agriculture.)

FEDERAL GRADING INSURES STANDARD GRAIN.



Army Labor Battalion Unloading American Wheat at a French Port.

## STANDARD GRAIN IS NOW ASSURED

Tests Are Applied From Country Elevators to Holds of Transatlantic Liners.

## BEST WHEAT GIVEN PREMIUM

Department of Agriculture Has Made Study of Marketing and Grading Practices—War Necessitated Some Changes.

From country elevators to the hold of a transatlantic liner wheat and corn destined for the army and the allies and almost all of that arriving at mills and terminal markets is handled on grades fixed and applied under federal supervision. The inspection of wheat and shelled corn is under the direction of the United States department of agriculture, with licensed inspectors located at small markets, terminals or at the seaboard and the standards in use are the same at all inspection points. Before federal grades were in effect there was little uniformity in grain standards at the different markets such as now exists throughout the United States.

In the past grain was often graded at country points on the basis of an average for the crop which placed the best grain in lower grades than it deserved. Now a grower of the best wheat receives a premium, even under fixed prices, for his extra care in producing it. Thus federal standards provide premium grades for grain of superior quality.

How Grades Were Made. Before the passage of the United States grain standards act complaints were received from foreign buyers and buyers of grain located outside the grain-producing sections of the United States, stating that grain purchased frequently did not conform to the grade specifications for which their contracts called. For over ten years the department of agriculture has made a study of grain marketing and grain grading practices throughout the United States and in foreign trade, obtained samples of many shipments, and devised apparatus for the mechanical determination of grading facts. Before the official grain standards were adopted they were submitted to representatives of producers and to the grain trade for suggestions and criticisms, and the standards were decided upon after all phases of marketing were considered so that no single interest would be favored at the expense of any other interest.

## Grades Revised for Wheat.

Because of the abnormal conditions in the grain trade, due to the war and the resulting fixed prices for wheat, certain changes in wheat grades were suggested. A series of five hearings were held during March of this year to receive suggestions from interested persons on the proposed revision of the official standards for wheat. Out of these hearings and the practical experience in supervising the application of the standards the grades were revised to have effect July 15, 1918. The changes were all in the nature of percentage of grains other than wheat, increase in the amount of foreign material present within each grade, and minor changes in definitions of classes and grades. Increased percentages of moisture were allowed in several grades, reduction in test weight per bushel was made in some instances, and more damaged and heat-damaged kernels allowed in some grades.

## How Grades Are Applied.

The bureau of markets of the department of agriculture now maintains 35 local offices at the principal grain markets to supervise the grad-

ing of wheat and shelled corn. The actual grading is done by licensed inspectors who are not employed by the department but operate either independently from fees collected for their services or are employed by commercial or state inspection departments. The work of the inspectors is checked up by representatives of the grain supervision division of the bureau of markets, which also maintains district supervisors and serves as a court of appeals whenever grades assigned by inspectors on interstate shipments are questioned by growers or dealers. All this organization assures that wheat and shelled corn inspected by licensed inspectors will be graded in accordance with the same fixed standards whether sold by country elevators, at terminal markets or in foreign markets.

## GRAIN GRADE APPEALS

If a farmer or dealer interested in a lot of wheat or corn sold by grade in interstate commerce questions the grade assigned, he can take an appeal or dispute to the secretary of agriculture, who determines the true grade.

To take an appeal he must notify the federal district supervisor by telegraph, telephone or mail, in advance of the arrival of the grain in the market, of his intention to appeal the inspector's grade; or after the arrival of the grain, within 48 hours after inspection. The name and address of the nearest federal supervisor can be secured by writing the bureau of markets, department of agriculture, Washington.

A dispute is an appeal on an interstate shipment of unsampled grain that moves between points where no licensed inspectors are located and where the grade has been determined by shipper or receiver. The method of taking a dispute is the same as in the case of an appeal.

Farmers and dealers can take up all grain-grading questions by writing or visiting federal grain supervision offices in the terminal markets.

## High Spots in Agriculture.

Mottled butter is due largely to uneven distribution of salt.

Operation of gins at rapid speeds injures the fiber of cotton by cutting it.

Three C's for caring for milk in the home: Keep it cold, covered and clean.

Oats watered to make them weigh more cannot legally be shipped in interstate commerce.

A ton of soy beans will yield about forty gallons of oil useful in various ways.

One hundred and twenty-five pairs of birds nest on the average farm in the Northwest.

Garlic flavor can be eliminated by heating milk to 145 degrees F. and blowing air through it.

The sense of direction in migratory birds is as marvelous as it is mysterious. The familiar inhabitants of the dooryard martin boxes return the next year, though meanwhile they have visited Brazil.

The melting point of Southern-made butter is higher where cattle are fed cottonseed products.

Fall plowing, disking and harrowing help to destroy eggs of grasshoppers and other insects.

Delicious table sirup can be made from cull and waste apples by home methods developed by the United States department of agriculture.

## Profitable Dairying.

High producing cows are the basis of profitable dairying. The most economical results cannot be obtained with poor producers.